

The Noises of Finance

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Abstract

What does finance sound like? Is it the clanging of the opening and closing bells at the New York Stock Exchange? The shouting of offers to buy or sell? The beeps made by cash registers as a credit card is swiped? The whirring of fans working overtime to cool computers? What is this noise?

Keywords

Music (Subfield), American Studies, Article, Digital Media, Economics, Information



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What does finance sound like? Is it the clanging of the opening and closing bells at the New York Stock Exchange? The shouting of offers to buy or sell? The beeps made by cash registers as a credit card is swiped? The whirring of fans working overtime to cool computers? What is this noise?

Noise, however, is not purely a sonic phenomenon. Since the late 1940s, noise has been intimately linked with theories of communication and information, as Aaron Trammell discusses in *Sounding Out!* posts such as [“What Mixtapes Can Teach Us About Noise.”](#) My research attempts to bring these two aspects of noise—the sonic and informatic—into conversation. I trace the interferences noise makes within a set of disparate disciplines: I listen to the history of the impact of information theory on experimental and electronic music; investigate the interferences of [“fearless speech,”](#) artistic robotics, and the public; and examine how noises digital and sonic have impacted the development of finance. Rather than creating my own definition of noise, I follow how other disciplines deal with their encounters with noise as both a material phenomenon—something that interferes with a signal, or a sound that is deemed unwanted—and as something to be theorized, asking questions such as what are the meanings of these noises? or should we be controlling noise at all?

In this post, I discuss three vignettes that outline the different ways in which noise (sonic and informatic) interferes with different aspects of finance: the shouts of open-outcry pits and the information they may or may not convey; new forms of electronic trading and the noises of server farms and trading behavior; and the Flash Crash of May 6th, 2010 that provoked noises from both traders and artists. Each reflects a particular conjunction of the sonic and informatic aspects of noise. When we attend to both components simultaneously, we discover that financial noises are

complex entities that are not inherently revolutionary nor regressive, but are rather an elusive combination of both.

Noisy Trading: The Pits

My interest in the noises of finance comes in part from listening to open-outcry trading, following the work of Caitlin Zaloom's *Out of the Pits: Traders And Technology from Chicago to London* and the documentary *Floored* (2008). An open-outcry pit, such as that found on the floor of the *Chicago Board of Trade (CBOT)*, pairs buyers and sellers through a bodily practice of trading involving the extremities of behavior. Shouting, pushing, and shoving occur on the steps of the pit as buyers and sellers work to match their orders through nearly whatever means necessary.



Chicago Board of Trade Corn pit, 1993, Image by Jeremy Kemp

In the wonderfully titled article “*Is Sound Just Noise?*”, the business school professors Joshua Coval and Tyler Shumway ask, in one of the few academic articles related to the sounds of the pits, whether or not the shouting might convey information that is not necessarily available on the computer screens that were then coming to dominate trading:

we ask whether there exists information that is regularly communicated across an open outcry pit but cannot be easily transmitted over a computer network. Any signals that convey information regarding the emotion of market participants—fear, excitement, uncertainty, eagerness, and so forth—are likely to be difficult to transmit across an electronic network (1890).

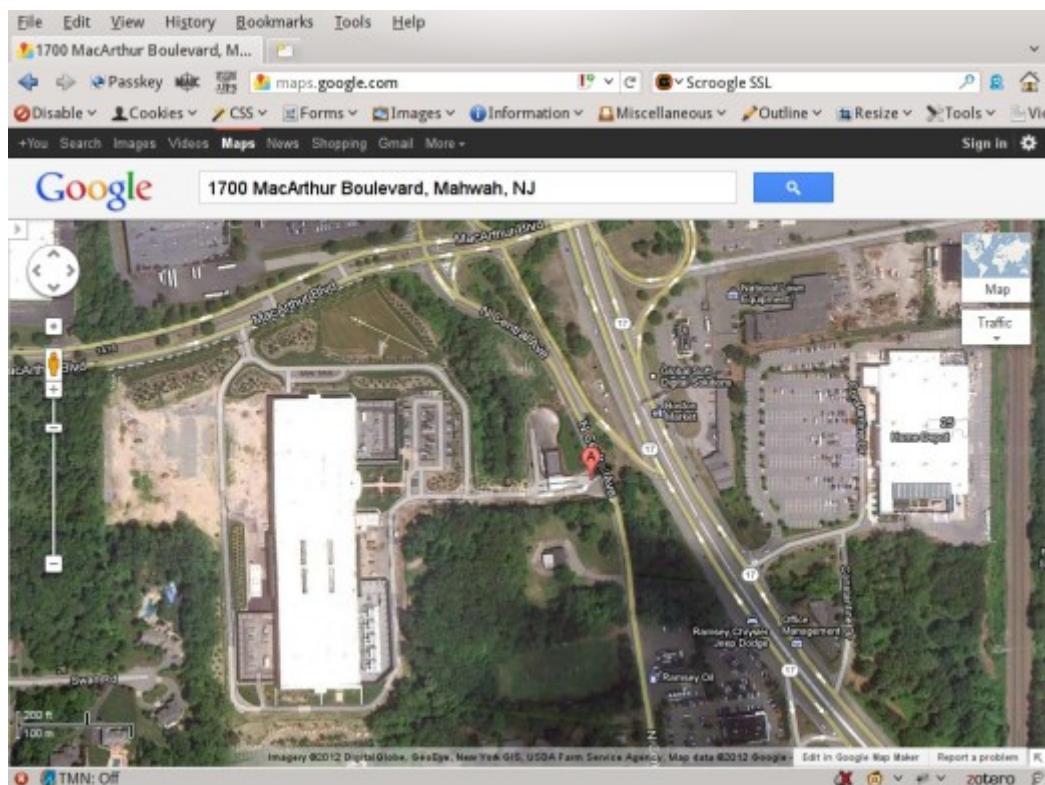
Coval and Shumway found that the ambient sound level of the pits did have predictive impact regarding various aspects of the market: in short, the louder the pits got, the higher the volatility in the prices of securities and the decrease in the likelihood of conducting a trade.

Noisy Trading, Redux: Datacenters



https://youtu.be/WstJM_aNSj8

Yet changes in the structure of the market have not only shifted the location of activity to people behind computer screens and away from these types of sounds, it has also shifted the actual location of the exchanges themselves. No longer do most trades take place in the physical location of, for example, the NYSE; rather, they take place in buildings like this one, at 1700 MacArthur Boulevard in Mahwah, NJ.



Screen capture by author

This is the location of the NYSE's new datacenter, a 400,000 square foot facility. (In the linked video, note the whirring of the fans, a new noise of finance beyond that of the pits.) The servers in these datacenters—run by highly-capitalized financial firms large and small alike—are able to respond much quicker to market information the closer they are to the computers that run the exchange. And what can be closer than being co-located in the same datacenter as the exchange? This need for speed has led to all sorts of interesting situations, such as [new fibre-optic lines being laid to shave off a millisecond or two in travel between New Jersey and Chicago](#), or the taking into account of [special relativity effects in the location of future datacenters](#). The new High-Frequency Trading (HFT) algorithms run on these servers in these datacenters.

Noisy Trades, Sonified: May 6th 2010

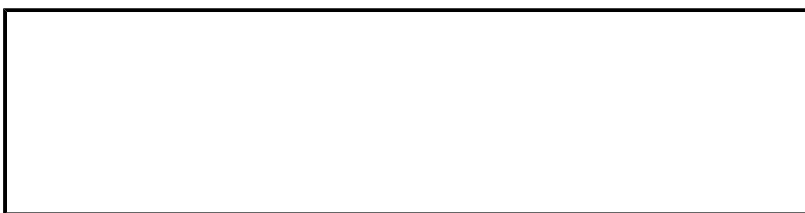
<https://youtu.be/1mC4tu1NhUA>

The voice on this recording, made on May 6th, 2010, belongs to Ben Lichenstein, an employee of a firm called [Trader's Audio](#). Now, Trader's Audio provides live coverage of market movements from a person on the floor of an exchange in order for day traders and others to get an idea of the "sentiment" of a market. It's kind of like a play-by-play of market activity, a running commentary of major market movements that can't be discerned solely by the watching of numbers on a screen. What, then, could have been going on for Ben Lichenstein to be in such a frenzy, for his voice to be inflected in such a way? What are we to make of this noise?

Well, May 6th, 2010 was the day of what has infamously become known as the Flash Crash. The full details of this day are beyond the scope of this post, so I will outline it schematically, following the [findings of the official US report produced by the Commodity Futures Trading Commission \(CFTC\) and the Securities and Exchange Commission \(SEC\)](#). (For a different take on this, see the sociologist of finance Donald MacKenzie's "[How to Make Money in Microseconds](#)".) In short, between the hours of 2 and 3PM Eastern Time the New York Stock Exchange (NYSE) had both its largest single day loss as well as its largest single day gain, a swing of over 600 points. A series of trades made by algorithms that failed to take into account their impact on the market caused the prices of securities to swing to extremes, exacerbated by the activity of High-Frequency Trading (HFT) algorithms. While the market eventually recovered—in part due to the activity of the same algorithms that caused the problem in the first place—the event indicated the precariousness of the stock market, the potential for things to spiral quickly out of control, and the difficulty in forecasting the behavior of an ecosystem of opaque algorithms.

How do the HFT algorithms relate to the Flash Crash that took place on May 6th, 2010? While the report of the CFTC and the SEC regarding the Flash Crash does not lay blame on HFT in particular, it did indicate how these algorithms contributed to the large price swings, the immense number of shares traded, and the drying up of liquidity (that is, the ability to find buyers and sellers in the market). One of the reasons why the market swings were so severe on May 6th, 2010 was due to the fact that HFT algorithms react immediately to small fluctuations of price, a quality of markets that financial economists call [microstructure noise](#), a fascinating topic that is unfortunately beyond the scope of this particular post. In general, HFT and these datacenters go hand-in-hand, as it is a truism that it will take longer for data to travel between a machine in New Jersey and one in Chicago, than it will to travel between two machines in the same data center in New Jersey. HFT works to take advantage of this shorter latency in order to exploit market movements on the timescale of milliseconds, accelerating trading far beyond the open-outcry pit.

Noisy Finance: The Sonic and the Informatic



Let's conclude with a sonic artifact of the Flash Crash from the French collective [rybn](#). Their work has explored the concept of "[antidatamining](#)," that is, the use of the "data mining" techniques of computational capitalism in order to shed light on the intersection of data and society. Consider their piece [FLASHCRASH SONIFICATION](#) (one of the few artistic responses to the Flash Crash), where rybn took trading data from nine different exchanges on the afternoon of the Flash Crash and created an austere, digitally-sharp yet undulating soundscape that recalls the work of artists [Ryoji Ikeda](#) or [Carsten Nicolai](#) without the rhythmic precision. If you can, listen to their online-available, two-channel mix on headphones in order to appreciate the details of the piece.

The building towards the end of “FLASHCRASH SONIFICATION” was meant to “emphasize the moment of the crash, [by] adding an effect of resonance, which propagates slowly, making it more tense, as the krach goes on” (all quotes in this paragraph from author’s personal interview with rybn). Thus instead of merely transparently translating the data into sound, rybn constructed the sonification in order to bring out this resonance: “resonance is pointed [to] as one of the major risk[s] of HFT by many economists and the feedback phenomenon was in the center of our discussions when we were preparing the piece.” Isolating the Flash Crash was important for rybn as it was perhaps the “moment when people started to understand financ[ial] orientations more clearly” thereby highlighting the symptomatic nature of the “speculative short-term loop finance seems to be stuck in.”

In FLASHCRASH SONIFICATION, sonic noise becomes a translation of the data from the market—abstract yet eminently material—into a different abstract form that does not immediately signify. FLASHCRASH SONIFICATION suggests rather than indicates; listening to it cannot provide us with rational information regarding the dynamics of the Flash Crash. Instead it produces a dark foreboding of the mechanisms at work, the high-frequency pulses first recalling heartbeats that soon speed up beyond any ability for distinction. In FLASHCRASH SONIFICATION, rybn comments on the inability for computation—and by extension, the market—to be the perfectly rational, ordered space it is ideally understood to be.

In Noise We Cannot Trust

If there is one thing clear about the examples of noises heard and encountered in this post—the shouting in the pits, the fluctuations of prices, the whirring of air conditioning, the sonification of the Flash Crash—it is that noise cannot be counted upon for positive or negative disruption. Noise cannot be counted upon as a political exploit in the market, as it can signify the potential of a trade, or be recuperated into profit through the activity of HFT algorithms. Yet noise can also provide an alternative experience of the Flash Crash beyond that of bureaucratic reports and figures. It is thus through the interferences noise causes within the dynamics of finance that we come into contact with the equivocality of noise as a phenomenon, and thus become attuned to a particular need to not confine noise to preconceived notions of positivity or negativity.

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Adriana Knouf (she/her/hers, sie/hir/hirs) is an Assistant Professor of Art + Design in the College of Arts, Media, and Design at Northeastern University. She is a media artist and scholar researching noise, interferences, boundaries, and limits in media technologies and communication.

Her current research project, tentatively entitled The Xenology Notebooks, is a transmedia, transdisciplinary corpus expansively considering the “xeno”. Her first book, How Noise Matters to Finance (University of Minnesota Press, 2016), traced how the concept of “noise” in the sonic and informatic domains of finance mutated throughout the late 20th century into the 21st.

Her current artistic research explores queer and trans futurities on earth and in the cosmos. Projects include Enredos Sónicos/Sonic Plots, a collaborative sonic exchange between the US and Cuba; they transmitted continuously / but our times rarely aligned / and their signals dissipated in the æther (2018-present), a 20 channel sound art installation with speakers made from handmade abaca paper and piezo electric elements, with sounds collected by custom antennas from satellite transmissions; and PIECES FOR PERFORMER(S) AND EXTRATERRESTRIAL ENTITIES (2017-present), event scores laser etched into handmade translucent abaca paper.



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